Micro-Moments, Liquidity, Intimacy and Automation: Developments in Programmatic Ad-tech

McStay, Andrew

Commercial communication in the digital age – information or disinformation?

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Andrew McStay

3.1 Micro-Moments, Liquidity, Intimacy and Automation: Developments in Programmatic Ad-tech

Abstract: This chapter assesses programmatic advertising. Programmatic advertising is characterised by sensitivity to time, location, interests and the ability to reach individuals across a variety of screen types. Here the advertising process is increasingly automated and has the capacity to target people in relation to what they are doing at a given moment in time. Automation applies not only to targeting, but the creation of adverts themselves. To explore recent trends in advertising I draw from developments in finance, liquidity and high-frequency trading. This is less about metaphor, but more that programmatic logic unmistakably derives from the automated price sorting of commodities in contemporary financial markets. This renews and clarifies long-standing critique of the audience-as-commodity. As the chapter proceeds to unpack, the principle of liquidity also has an experiential and phenomenological dimension that is redolent of what Google phrases in terms of 'micro-moments'. This is a realisation of programmatic logic as advertising seeks to intelligently interact with a person's life context in real-time.

1 Introduction

This chapter reflects on behavioural developments in advertising. I focus explicitly on programmatic techniques that promise advertisers the capacity to offer the right message, to the right person, at the right time. This means being able to reach across device types, apps, websites and platforms to reach people with videos, rich media, static and native ads, and even promoted tweets. To do this, advertisers bid in real-time for advertising space and consumer attention. The objective of programmatic techniques (henceforth known as 'programmatic' to reflect industry usage of the term) arguably has less to do with long-term branding and stimulation of desire, than interacting with people at moments when they may be most pre-disposed to acting, clicking or purchasing. As will be developed, another key characteristic is that programmatic is automated. Whereas advertising deals once took days and even weeks to negotiate, and media had to be bought weeks if not months upfront, programmatic allows this

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haggling and buying to take place in the time it takes to load a webpage. Programmatic advertising is an auction-based process whereby potentially thousands of media buyers bid for the right to present advertising to a known target.

Whereas behavioural advertising is oriented to desktop computers using the web, programmatic approaches are based on understanding always-connected people who use a variety of screens and technologies. Programmatic includes, expands and develops web-based behavioural techniques that use cookies to trace and cluster web searches, and thereafter serve advertising on the basis of who a person is rather than what they are looking at. After all, we search on tablets while in front of the TV; review videos about products on YouTube; use apps on the move to search for cafés to rest weary feet; and then use mobile devices to decide what to do once revived (such as shopping, exhibitions, sight-seeing or where to go for lunch). Advertisers seek to understand journeys and behaviour, and thereafter be able to reach the right people with salient messages when they are most likely to spend money, and understand which stimuli were influential in getting us to click or buy. This is achieved by organising information about us typically collected through apps, social media, web browsing, video watching, stores visited and physical location. To provide a sense of popularity and scale of this approach, in 2015 *Advertising Age* reckoned that programmatic buying would take $14.88 billion of the approximately $58.6 billion digital advertising market (Kantrowitw 2015). This equates to roughly 25% of the entire digital advertising industry. In *theory*, programmatic offers advertisers greater precision in: who to target; geographies and times of day; command over the beginning, mid and end stages of campaigns; evaluation of what is working well and not so well; and which ads are being engaged with so as to only pay for ads that are quantifiably effective. The lure of programmatic is the promise of enhanced control of the advertising process.

To provide understanding of the implications of programmatic approaches, I begin by outlining the automotive context to programmatic advertising and then progress to offer a robust account of the practicalities of programmatic advertising. This is important so as to avoid glib theorising in later sections. Having developed an understanding of the character and form of programmatic advertising, I then move to detail the significance of programmatic logic. By this I mean why it is important, and what the implications and consequences are. By this stage we will possess a solid understanding of the practicalities of programmatic so that we can begin to deal with it at the level of logic and theory. This will allow us to more clearly see what it portends in terms of: *liquidity*, or exposure of media and audiences to commodity mechanisms found in the purer domain of high-speed finance; and *micro-moments*, Google's moniker for programmatic advertising that uses big data analytics and machine learning to target people as they

move through everyday life. Although these expressions derive from automated market trading, ad-tech and on-going work in machinic pattern recognition, I suggest that they are best appreciated with phenomenological sensitivity.

2 Background: The Story So Far

Readers of this book are likely to be familiar with behavioural advertising. Although the term rightly suggests advertising that targets according to a person's behaviour, it is more accurately defined in terms of third-party tracking cookies that are employed by ad networks to gauge our interests. The role of ad networks is to match ad spaces provided to them by web publishers with ads for appropriate audiences. They do this by placing tracking cookies on people's computers so when an Internet user visits a website participating in that particular network, the user will have a tracking cookie installed on his or her machine that will register each time he or she visits another site participating in that network. For a sense of scale, the leading ad networks in the UK (Advertising.com, Yahoo! and Google/DoubleClick) each reach 90% of the UK's online audience. Cookies, or identifying pieces of code, tell ad networks what sorts of sites people have visited so they can target them with appropriate advertising. The reason why web publishers use third-party ad networks is so they can make revenue from their ad spaces without having to go to the effort of selling slots to advertisers. In other words, it is a labour activity that makes use of the economies of scale that well-connected ad networks can provide. The success of ad networks should be judged by the extent to which they can marry available inventory from web publishers with demand from advertisers for: a) spaces in which to place their advertising; and b) specific types of people they wish to reach. Segmentation in behavioural advertising typically relies on five to ten attributes (such as age, gender, income, geography, education, mind-set and interests), but programmatic buying systems can evaluate an exponentially large amount of input. This is the first notable point of this chapter: programmatic advertising makes use of a more diverse range of data sources than behavioural techniques. Before we properly discuss and define programmatic advertising, there are a few more terms and practices we first need to understand.

We now understand that ad networks are entities that serve cookies to users and third party advertising on publishers' sites. The next form of organisation to recognise is the ad exchange. Ad networks and ad exchanges are related and often confused, but they are actually quite different. An ad exchange is similar to a stock exchange in that they auction impressions (the unit for serving an ad once) to the highest bidder. Whereas ad networks sell bulk amounts of ad spaces

(bundled to be appropriate for specific age, gender, geography and interests), the advent of ad exchanges allows buyers and sellers to value inventory on an impression-by-impression basis that is *bid* for in real-time. This means that theoretically publishers have a better sense of who is buying and at what cost. From the advertiser's point of view, they receive feedback on how each impression has performed. This is impressive if we try (and fail) to consider how many online ad impressions are served by the hour or day. The function of an ad exchange is to allow advertisers (or an intermediary agency acting on their behalf) to bid to serve an ad in real-time. This 'real-time' is defined in terms of the time it takes a webpage to load (if you press 'refresh' on your browser, it is that long). The process is that:

- a person uses an online device;
- the device requests an ad from an ad server;
- the request is redirected to an ad exchange;
- the opportunity to present an ad is bid for in real-time;
- the winner serves the ad;
- the person sees the ad.

The success of an advertiser's bid is decided by data about the type of user and their interests. The role of the ad exchange is to host the auction and establish the right user for a specific ad, on a given medium, at a price the advertiser is willing to pay. The ad stock includes display, rich media, video, mobile, tablet and social media inventory. As there are multiple advertisers looking for the same customer at the same time, real-time buying (RTB) exchanges hold real-time auctions to decide who is the best fit with the potential customer. The winner of the auction and the price of the ad space are determined by *context* (relevance of the site to their product/service/organisation type) and *audience* (how good a match the viewer is for the advertiser).

3 Programmatic

This brings us to programmatic advertising, or the capacity for advertisers to automatically target consumers across a range of devices. Even within industry discussion, RTB and programmatic approaches are confused, but there are important differences. Programmatic typically (but not always) uses real-time exchanges to buy ad space. The difference is that whereas RTB is a specific way to purchase ad space (by means of auctions held as a webpage loads), programmatic is a method to determine if the inventory space (slots on a webpage) is

right for the advertiser who wants to purchase it. This involves a richer than hitherto understanding of audiences. Although media space may be bought via RTB methods (and often is), programmatic ad buys can involve purchasing ads that have a fixed cost (rather than bid-for ones that have a changeable price). In easier to digest terms, ad spaces might be purchased direct from the publishers of *The Economist* website so that the inventory and price is agreed and fixed. The programmatic part of the transaction that differentiates it from a traditional direct sale is the automation of the ad serving process on *The Economist* webpage.

I appreciate that the range of practices is difficult to visualise (and is potentially somewhat tedious), but the key characteristic is that the buying and selling of individual (impression-by-impression) advertising opportunities happens with little human intervention (although some is required to enter campaign objectives and budget). From the point of view of the advertiser wishing to advertise, this removes a great deal of complexity as programmatic promises to black-box the entire advertising process (media decisions, profiling, targeting, delivery of ads and as developed below, even creativity). This can be contrasted with the usual media-buying mechanisms of discussion between ad companies and publishers, telephone calls, emails, person hours, paper work and expensive executives. To put automated and programmatic advertising into context, since the inception of advertising and newspapers in 1702,[1] advertisers have bought their advertising by talking to and negotiating rates with people. They were locked in to a contract, forced to run a certain number of ads with a publisher and had little idea whether anyone engaged with the advertising. The difference is that the automation of buying and selling advertising space allows ad buying and management of engagement on a per-impression basis.

We gain even more insight when we consider that programmatic advertising requires a great deal of information about users. As will be developed later, the make-up of *programmatic logic* is to know more about the viewing and motives of the person clicking. Whereas behavioural advertising makes use of cookie-based data, programmatic draws on a much wider range of data points, not least information from apps used on mobile phones. Traditional behavioural advertising that uses third-party cookies does not work on Apple iOS devices because it does not allow third-party tracking cookies. Instead mobile programmatic companies make use of "device IDs; deterministic identifiers unique to handsets, or probabilistic determination; using multiple data points to create statistical models" (Internet Advertising Bureau (IAB) 2015).

1 Arguably since 1702 in the UK, when advertising was carried in the first newspaper *The Daily Courant*.

There are three sorts of data that programmatic advertising makes use of, including *first-party* data, the most valuable sort, where information is collected and aggregated directly by a given web publisher. This might include purchase behaviour and how people behave on their websites. The next tier of data that programmatic can make use of is *second-party* data. This involves an unusual business arrangement where a partner (company A) is willing to share customer data with company B (and vice versa). For example, a person interested in premium music amplifiers might visit the partner company's site about premium speakers and be tagged with a cookie. Lastly it also involves *third-party* data, or information that is bought and sold in an open market environment. In programmatic, this provides a great deal more data about audiences than can be identified and extracted by behavioural ad networks. This data is bought from what are known as data management platforms (DMPs), or data aggregators, who have relationships with a large number of websites in order to gain a big-picture view of users (by means of cookies and IDs on mobile phones). Notable examples include organisations such as eXelate, Lotame and Bluekai. Third-party data can come from a range of places including online tracking (as with behavioural advertising), but also website registration data, public records and offline transaction data such as loyalty cards. These different data streams can be used together. Lotame for example promises marketers that they can marry their own data (from past campaigns, traffic through website and apps they might own) with third-party demographic and behavioural information provided by data sources around the world (such as MasterCard, BlueKai and Kantar). The outcome of being able to make use of first, second and third-party data is that advertisers (or first-parties) often possess colossal databases that are goldmines of information about the buying habits and location of their customers. Supermarkets and people's favourite retailers for example hold a great deal of information about consumer history and interests. What programmatic allows is the capacity to merge these with publically available demographic data, mobile phone and credit card information, social media, and other sources available to DMPs.

Programmatic also promises improved *re-targeting* (when online advertising is targeted at consumers who visited a publisher's website but did not buy or fulfil a desired action) and sensitivity to the context in which advertising takes place. This varies but may include: content that appears next to the ad, device on which the ad is delivered, part of the day, day of the week and environmental factors such as news that is being reported, sports results or celebrity events. Beyond the automated serving of display advertising, it also promises to assist in understanding effectiveness. From the point of view of the industry, this is the most significant point, but in addition to real-time bidding, ad serving, ad

tracking and overall campaign management, programmatic technologies may also create ads to suit contexts by automated means.

3.1 Dynamic Creative Optimisation

This is where we see a clear difference between RTB and what programmatic portends. Although today programmatic is primarily a buying and serving method, it also promises 'dynamic creative optimisation'. This entails the capacity to automatically (without human intervention) alter ads to fit the viewer and their context in real-time. For example on launching the game Madden NFL 15 in 2015, EA Sports working with Google used mobile ads with different combinations of copy, images, and backgrounds to reflected what was happening in the game at that exact moment. Similarly, other brands have optimised their ads to account for location, time of day and the weather. Adobe for example, echoing other programmatic firms, also promise their advertisers that they can 'build, personalize and deliver creative assets in real time' and that 'Adobe offers the only platform that combines advertising, data and creative optimization to redefine programmatic marketing' (Adobe 2015). Although one might associate Adobe with their web design and imaging software, they are aggressive actors in the programmatic advertising business. For a sense of the diverse range of data types they employ to deliver dynamic content, Adobe's (2016) privacy page says that their analytics services collects data (including personal data) on: the URLs of the webpages people visit and the time spent on them; the URL of the page that showed the link people clicked on that brought them to that company's website; the searches that people have performed, including searches that led them to that company's website; information about the browser and device, such as device type, operating system, connection speed, and display settings; IP address, which Adobe say they may use to approximate general location; information people may provide on that company's website, including information on registration forms; whether they clicked on an ad; items they have either purchased or placed within the shopping cart feature on that company's website; and social network profile information, including photos, fan and like status, user IDs, age, and gender. Adobe continues by saying that some companies using Adobe services may send them information that allows them to identify users personally (this is the first party information mentioned above). Further, some companies may also buy additional information about users and then add that additional information to the information collected by Adobe's products on their websites. This additional information may include things like email addresses, account information, or Facebook profile information, including photos and usernames.

3.2 The Automation of Advertising

Although often lauded as a creative business, the advertising industry has long been interested in quantification, feedback, analysis, verification systems and machine-like approaches to targeting and creating ads. This is best understood when one considers that the rise of dedicated ad agencies in the late 1800s parallels the rise of industrial production methods, distribution and management. Taking cues from the empiricism of science, this approach overtly emphasised cause and effect, predictability, control, data and the need to inject certainty into the advertising production process. Although the advertising giants of old introduced machinism into its methods, they could not have predicted the automation of creating, targeting, serving and collecting data about the reception of ad content so as to generate dynamic advertising experiences.

3.3 Liquidity in Advertising

As is now clear, programmatic advertising involves automated exchanges to deploy the right message, to the right person, at the right time, across a range of media. There are different types of programmatic buying: some of which are open to all potential buyers, and others where only certain types of buyers/advertisers are allowed. In this section I discuss the open auction format[2] whereby a publisher allows any buyers to purchase their inventory at a cost dictated by open market mechanisms. This is an important feature because advertising is borrowing technology and techniques from the world of high-speed trading and investment banking. We might consider the tone and character of high-frequency trading. In the real-time finance sector people are largely redundant as investment banks, fund managers and traders place their faith in algorithms run by computers to buy and sell shares. To a very real degree, global finance is automated in that it operates with little human intervention. High-frequency trading (HFT) is controversial, but in Europe it forms over 30% of market traffic. In the USA it is 70% (Ross et al. 2012). Its dramatic rise to prominence has polarised opinion in the political and financial sectors. Exponents say it has reduced trading costs and increased activity on markets – but critics point to two devastating US American market collapses in which HFT played a central

2 Other formats include 'Automated Guaranteed' (where the content does not go through an exchange, and deals are negotiated directly between buyer and seller); 'Unreserved Fixed Rate' (where costs of content are fixed upfront); and 'Invitation-Only Auction' (where only select advertisers can bid).

role. And now European policy makers are debating whether to impose severe limits on HFT. Influential figures are even calling for it to be banned.

This is utterly unbridled capitalism in which trading is not just about buying low and selling high, but doing so at maximum velocity. Rather than landing 'the big deal' (maximum difference between buy and sell), automated high-speed trading takes advantage of tiny price discrepancies that only exist over the most infinitesimally small time horizons. The profit comes from being able to take advantages of these small profit opportunities multiple times. For a sense of speed, an article for the Bureau of Investigative Journalism comments that 'HFT takes place at speeds more commonly associated with particle physics. In the quarter of a second it takes you to blink, an HFT computer can carry out over 5,000 transactions' (Ross et al. 2012). Without hyperbole, this is literally a war of the machines. In the finance industry we see machines (or 'algobots') combating each other to shave a few millionths of a second off trading time. This is done by placing servers close to the Internet exchange and investing in ultra-high speed feeds of market data to shave microseconds off 'latency', or the time it takes a trader's message to reach the exchange and return.

Although there are differences between advertising and financial technologies, there are commonalities, particularly with regard to the principle of *liquidity*. I use this expression both in a financial and ontological sense, although these are not separate. After all, our trading, banking, and payment technologies play a fundamental role in shaping our modern world and social reality. In financial terms, liquidity refers to the capacity of a market to maintain a stable asset price. The notion of stability is the capacity to buy or sell an asset without any significant change in the price of the asset. Cash for example is the most liquid of assets because it can be exchanged with no loss of intrinsic value. A house that nobody wants to buy has low liquidity value. What programmatic (particularly the open auction format) adds to the advertising market is greater liquidity of advertising media spaces, opportunities to serve ad impressions through these spaces, and the data about audiences. This is due to an exponentially increased number of bidders, buyers and sellers of advertising slots. Thus, because of the high number of exchanges taking place in the programmatic media environment, a seller's assets (such as advertising opportunities and audiences) are quickly and truly valued. The advertising system is not as smooth or advanced as that found in finance, but high frequency trading provides an excellent sense of the direction, potential and orientation, of the digital advertising sector. A barrier to this today is lack of transparency in the advertising market. This is because there is a difference between what an advertiser will pay for programmatic advertising and what a publisher will receive. Whereas in

finance the figure is the same, in advertising an intermediary takes a large slice of what an advertiser pays. This can happen at multiple points along the advertising value chain that brings together advertisers (who want the advertising space) and the publisher (who owns the media space). Ultimately it is unclear what fees are being paid and who along the advertising production chain[3] is adding extra cost. Part of the task for trade associations such as the Internet Advertising Bureau today is to create a trading environment where there is greater transparency over fees/prices, the bidding process and inventory.

Further, both buyers and sellers of ad space would like to know what the price of this *commodity* is going to be in the *future*. Be this orange juice, coffee or indeed ad space, buyers are keen to buy now if they think prices will go up, while sellers seek to have future revenue assured (lowering future risk). What is desirable for both buyers and sellers is reliable information about the market price of ad space both now and tomorrow[4]. This is what an *Advertising Age* article refers to as a 'forward marketplace' (Bruell 2015). The potential consequence of this is that ad space itself is not only exchanged in real time, but contracts would be auctioned for ad space to be delivered on a specified future date/time. I appreciate this is rather detailed, but the take-home point is the shift of digitally enhanced advertising towards a commodities market.

By seeing it through future-oriented market logic, ad space can be bought and sold on by the buyer of the ad space. So, for example, if marketer/trader X has paid 15€ per 1000 impressions for video display ad spaces, to reach audience Y over Christmas, then if the price of ad space to reach this particular audience increases, marketer/trader X may sell this stock and profit from the price difference. Even further, the consequence of this is that speculators with no interest in using the space for advertising may buy and trade in this stock, just as they would with tea or steel. This may still seem somewhat abstract and unimportant, but what futures-based programmatic represents is a model for the future of advertising. This becomes even more significant if we project a few years down the line and see behavioural and programmatic advertising encompassing PCs, tablets and mobiles, and also television and networked outdoor media in so-called smart cities. Although advertising is typically held to be the public face of capitalism, the reality is that in terms of liquidity and market

3 The value chain of programmatic advertising is: advertiser > agency > trading desk > demand side platform (DSP) > ad exchange > publisher Internet Advertising Bureau (IAB) 2013

4 Traditional ad space of course fluctuates throughout the year (Superbowl minutes and pre-christmas television is more expensive than 3 am on a Wednesday), but the point is that both buyers and sellers of these slots appreciate certainty.

logic, it is catching up with other commodity forms. The move toward treating media space as a more abstract commodity portends a very different sort of media system and a very different way of doing advertising. This is possible now because these exchanges and marketplaces provide an automated record of every transaction and a clear record of trades.

Thus, the long cherished audience-as-commodity principle (Fuchs 2012; McStay 2011; Smythe 1981) finds renewed impetus and full realization as firms such as Mass Exchange lead the way in not only ad space futures exchange, but also audience future exchanges. This means that advertisers can buy guaranteed interest from people with desirable characteristics (for example, mothers in a given region on a certain income range between 18 and 25 years old). Historically audiences have been dubbed a commodity, but this is something of a misnomer because it was not the audience being traded on an open market, but the ad space with an assumed audience attached. Now audiences become a real commodity as they are placed onto a more public market open to speculators who may have no interest in advertising (or audiences) whatsoever and, importantly, audience value is determined by what the market (and its players) is willing to pay (liquidity).

4 From Privacy to Intimacy

Much critical scrutiny is paid to the extent to which advertising techniques based on people's behaviour is invasive of privacy (Baruh 2007; McStay 2011, 2016; Zuiderveen Borgesius 2015). However, this section suggests critical considerations that are related but different. A controversial claim within contemporary ad-tech is the promise of knowing people in greater detail and generating more effective advertising, without the need for high amounts of personally identifiable information (PII). This is digitally acquired information that can be used either on its own or in combination with other items of information to identify people. However, what programmatic claims is that use of diverse aggregated data sets can target people *like* you, but not you. The claim is that advertising can be intimate without being personal. My point is *not* that advertising no longer uses personal information (it does), nor are there no longer questions to be asked about privacy (there are); but recognition of a tendency within the industry to try to be more intimate without relying on increasingly personalized and identifying data. This is driven in large part by a need to circumnavigate regulations. My argument is that attention should be paid to practices and experiences that are affective and intimate, and that we should also note that this intimacy is achieved through increased use of aggregation.

This merely echoes what advertising has always sought to do. In a sense, traditional advertising has had to execute a more difficult trick than digital approaches because it is required to communicate personally through broadcast means. The most successful of 'classic' advertising is aimed at groups, but sees these as clusters of individuals to be influenced and persuaded on a one-by-one basis. This is intimacy at scale. Contemporary means of achieving intimacy are based on big data logic in that programmatic makes use of more data points and sources (online and offline), aggregates these, and processes them in real time. This provides greater agility and reactivity by means of high levels of data collection (about history, behaviour, places, devices, channels and contexts), yet aggregating these so the resultant targeting is based on small group profiles rather than individuals. Further, for mobile and tablet devices that make use of Android's 'Advertising ID' and Apple's 'Identifier for Advertisers', this is targeted at advertising IDs that are not permanent, not tied to a device and can be re-set (although it is debatable how privacy-enhancing this is in practice). The net result is an attempt to balance high levels of data gathering and anonymisation techniques to create experiences that feel intimate, yet reduce levels of personal data processing.

4.1 Micro-Moments

The principle of intimacy is an important one because a key feature of programmatic is that it allows advertisers to target 'micro-moments', or those short periods of time when we are most receptive to a message intended to influence us (DoubleClick 2015). There is a range of factors to consider including location, proximity to retailers, discovery (ooh/aha!), what we are saying, who we are saying it to, what we have searched for, videos we have watched, environmental factors such as temperature/weather and even our physical state. Due to the fact that smartphone users are typically always connected to the Internet, our behaviour (physical and online) belies intent, interests, marketing opportunities and readiness for appropriate messages.

Ontology is the admittedly vague term that refers to what exists for people. It is an attempt to get at the quality and character of reality, how we experience it, and how it is affected by the introduction of new variables (such as technologies, but also other phenomena). This is not just idle tracing of parallels between technology and the humanities, because mega-tech and user experience firms are deeply interested in the interaction between computing and human experience. Programmatic micro-moments such as those discussed by Google's DoubleClick represent something quite new in that it does not just seek to understand preferences or interests, but moments. In fact 'interact' is a better

word than 'understand' to characterize how advertising engages with moments because understanding does not matter, only effectiveness. This becomes clearer when we recognise that this form of understanding is predicated on being intimate, relevant, salient and timely. Technologies do not understand us but effectively engage with potent moments when we may be swayed and affected in a way useful to a given advertiser. Although 'micro-moments' serve to simplify and storify programmatic practices for DoubleClick's clients, the premise and orientation is worthy of consideration. For DoubleClick (2015) this is recognition that our days are populated by 'intent-rich moments when preferences are shaped and decisions are made'. This premise is better understood when we recognise advertisers' interest in attribution, or the attempt to quantify what aspects of advertising influences us, when influence occurs and to what degree. This does not just involve the appreciation of single moments but the series of life events that inform moments (where we might buy or click something). This puts us in a phenomenological bind in that programmatic logic promises to interact with us at the level of quality, feeling and emotion; yet it uses tools historically thought of as alien to understanding experience. By definition phenomenologists should disagree that the meaning of the poem can be found in the form of the letters of which it is composed (to borrow from Bergson 1999 [1913], p. 35). If this is unclear, phenomenological criticisms are similar to Searle's (1998) epiphenomenal *Chinese Room* argument about how symbol-processing machines cannot be said to have a mind because they do not understand the content they are processing.

4.2 Machinic Verisimilitude

There is a very basic difficulty in tracing the relationship between technology and human beings because this would require that machines could be ontologically oriented to know what people discuss in terms of quality. This is both physically and philosophically problematic in that people and machines are made of different stuff, and that human understanding is based on a granularity of contextual sensitivity that machines are incapable of. Although we will not resolve the question of 'what is consciousness and subjectivity' here, what we can say is that much of what we consider to be subjective and private is already more public than we usually think. Language, symbol use, status, ethics and identity are all constituted by relational and social factors. By being social they are public, and by being public they are observable. Machines may not be as good as people at comprehension of motives, but they excel at observing and remembering at levels and in ways impossible for people. This involves watching, listening, sensing and making inferences about actions or inaction. Memory

also plays a role acting as an analytical repository with which to judge (in reference to a set of given values) what is appropriate, and clearly a-historical machinic capacities have advantages over people in this regard. This is *a-historical data mining*, or the capacity for equal recall to either recent or older behavioural traces. This is not about authenticity, but affective, effective and predictive knowledge. We do not have to concern ourselves with whether machines really understand, but consider what elsewhere I have termed *machinic verisimilitude* (McStay 2014). This entails semblance of intimate knowledge of people, and engagement with the subtleties of qualia and human experience. From a more practical advertising point of view, it is the capacity to generate exactly the right message, to the right person, at precisely the right time, so as to take advantage of moments in a person's daily life flow. This has less to do with people thought of as private self-contained unities with private interior experiences inaccessible to others, but a more public view of personhood. This is a more civic interpretation that sees a person come into being through interaction at physical, intellectual, linguistic and social-semiotic levels. As these are public structures, behaviour can (at least theoretically) be traced within these. This public view of selfhood is defined in terms of probability, expectation and delivery of what we expect a person to do, given an assessment of their current state, and what is known of their behavioural dispositions, history and connections with others. This is less about privileged access to private thoughts to confirm suppositions about *real* motives and feelings, but instead correct assessment of public data verified by the predictive power of machinic insight (such as whether we click, buy or visit after being exposed to X stimuli in Y circumstance at Z moment). After all, the advertising industry does not care about consciousness and being per se, but functionality and effectiveness defined in terms of predictive ability and the capacity for machines to meaningfully interact with people in micro-moments. To go further, it is a resounding success if it can say with certainty that it does not personally 'know' people, yet is able to influence them at key decision points as if it did. Thus, it does not matter whether machines can *truly* know us but whether they can predict what we will do next and influence outcomes, particularly at micro-moments when we may be influenced and pivoted towards a different path.

5 Conclusion

In conclusion we see that programmatic advertising is significant in multiple respects. To list: it offers advertisers greater granularity in terms of *what* they are saying, *whom* they are targeting, on *which* media and *when* this takes place. Underpinning this are novel technologies and practices. These are characterised

by automation, more sophisticated data collection and processing, and media and audience markets characterised by greater liquidity. If we also consider potential for high frequency trading and marginal gains selling provided at dizzying speeds in an automated and self-driven marketplace, we see fundamental changes in the nature of advertising. Before we bow to the modern digital sublime, or conjure dystopias, we should not fall prey to the belief that programmatic is a perfect system for advertisers. Today, due to the fact that it targets people rather than the content of websites, there is an inbuilt lack of control over precisely where ads will land. This worries advertisers because unfortunate ad placements can damage the reputation of the brand. It is also besieged by ad fraud, botnets and even questions of whether real people or machines are clicking on ads[5]. Programmatic is not an omnipotent advertising system, but the logic that underpins programmatic is too powerful to be deterred. It has a number of characteristics in that it intends to map the entire *context* of our lives, and it seeks informational and emotional relevance at precisely the right instant. At the level of principle, it is not contained by desktop, tablet or mobile devices, but will spill over onto televisions and into networked ads in our cities. For example, in 2015 we saw the first rollout of artificial emotional intelligence in out-of-home advertising and it is a short step to connect smartphones with these practices (McStay 2015). The language of programmatic advertising also invites philosophical sensitivity as it seeks to understand and influence human 'micro-moments'. This phrasing by DoubleClick takes on significance when: a) we recollect that this is Google's programmatic service; and b) that Google is investing heavily[6] in the business of deep learning, so to better understand the context of human lives and real world complexity through neural networks, reinforcement, consolidation, adaptation, carrying learning from the past into the future, and approaches that share characteristics with human learning.

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5 This is malicious software that takes over people's computers and simulates a person browsing the web. These bots (or non-human traffic) will never buy anything so the ad exposure is useless to an advertiser that is paying the ad network, who in turn is paying the publisher McStay 2016. This is not a trifling problem for the ad industry because the scale of this problem is huge. For a sense of scale, in 2015 advertisers were projected to lose $6.3 billion advertising to bots from $40 billion spent globally on display ads and the estimated $8.3 billion spent globally on video ads White Ops 2014.

6 See for example Deepmind that was acquired by Google and promises to 'solve intelligence' by combining 'the best techniques from machine learning and systems neuroscience to build powerful general-purpose learning algorithms'.

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